PITAGORAS ACADEMIA

PROGRAMA DE AVANCE ACADÉMICO VIRTUAL.

CICLO: SEMESTRAL CATÓLICA.

CURSO: TRIGONOMETRÍA.

TEMA: Identidades trigonométricas fundamentales.

1. Reduzca

$$M = \frac{\cos\theta}{\sec\theta} + \frac{\text{sen}\theta}{\csc\theta} + 1$$

A. $\text{sen}\theta + 1$ B. $\cos^2\theta + 1$
C. 2 D. 0

2. Reduzca

$E = \frac{\cos\alpha.\cot\alpha + \text{sen}\,\alpha}{\csc\alpha.\cos\alpha}$

A. $\text{sen}\,\alpha$ B. $\cos\alpha$
C. $\sec\alpha$ D. $\csc\alpha$

3. Simplifique

$A = \frac{1}{1+\csc^2 x} + \frac{1}{1+sen^2 x}$

A. 0 B. 1
C. 2 D. $\text{sen}^2 x$

4. Simplifique

$$S = \frac{\csc x - \text{sen}\,x}{\sec x - \cos x}$$

A. $\tan^2 x$ B. $\cot^2 x$
C. $\tan^3 x$ D. $\cot^3 x$

5. Reduzca

$$K = \frac{\csc^2\beta - \cot^2\beta}{\csc\beta + \cot\beta} + \cot\beta$$

A. $\sec\beta$ B. $\csc\beta$
C. $\text{sen}\,\beta$ D. $\cos\beta$

6. Simplifique

$M = (\text{sen}\beta + \cos\beta - 1)(\text{sen}\beta + \cos\beta + 1) - 2\text{sen}\beta.\cos\beta$

A. 1 B. 2
C. 0 D. 4

7. Si $\text{sen}\,x - \cos x = \sqrt{3}$. Calcule $\text{sen}\,x.\cos x$.

A. 0 B. 1
C. -1 D. 2

8. Si $\text{sen}\,x + \cos x = \frac{1}{\sqrt{2}}$. Calcule $\text{sen}\,x.\cos x$.

A. 1/2 B. 1/3
C. 1/4 D. -1/4

9. Reduzca

$$M = \frac{\cos\theta}{1 - \text{sen}\theta} - \frac{\cos\theta}{1 + \text{sen}\theta}$$

A. $\tan\theta$ B. $\tan^2\theta$
C. $\tan^3\theta$ D. $2\tan\theta$

10. Si $\tan x + \cot x = 3$. Calcule $\tan^3 x + \cot^3 x$.

A. 15 B. 18
C. 21 D. 20

11. halle M. Si

$\frac{\cos\alpha}{1+\text{sen}\,\alpha} + \frac{\cos\alpha}{1-\text{sen}\,\alpha} = \frac{2}{M}$

A. $\cos\alpha$ B. $\tan\alpha$
C. $\csc\alpha$ D. $\cot\alpha$



12. Si $\sqrt{\tan\alpha} + \sqrt{\cot\alpha} = \sqrt{5}$, calcule $\tan^2\alpha + \csc^2\alpha$.

A. 6 B. 7
C. 8 D. 9

13. Simplifique
$$E = \left(\frac{\operatorname{sen} x}{1+\cos x} + \frac{1+3\cos x}{\operatorname{sen} x}\right)(\csc x - \cot x)$$

A. 4 B. 6
C. 2 D. 8

14. Si $\sec x + \tan x = 2$, calcule $E = 2\operatorname{sen} x + \cos x$

A. 1 B. 2
C. 2.5 D. 3

15. Si $\sqrt{2}\operatorname{sen} x + \operatorname{sen}^2 x - 1 = 0$, calcule:
$$N = \cos^4 x + \cos^2 x + \sqrt{2}\operatorname{sen} x$$

A. 1 B. $\sqrt{2}$
C. $2\sqrt{2}$ D. 2

16. Simplifique
$$A = \frac{\tan^2 x+\cot^2 x-2}{\tan x+\cot x-2} - \frac{\tan^2 x+\cot^2 x+1}{\tan x+\cot x+1}$$

A. -3 B. 6
C. 5 D. 3

17. Si $\operatorname{sen}^2 x + \operatorname{sen} x = 1$. Calcule
$$P = \cos x - \tan x + 1$$

A. 0 B. 1
C. 2 D. 3

18. Simplifique
$$E = \frac{\operatorname{sen}^4 x + \cos^2 x}{\cos^4 x + \operatorname{sen}^2 x}$$

A. $\tan^2 x$ B. $\cot^2 x$
C. $\sec^2 x$ D. 1

19. Si $\frac{sen\,\alpha}{\sqrt[3]{2}} = \frac{cos\,\alpha}{\sqrt[3]{3}}$, calcule
$$A = \frac{\sec\alpha - \cos\alpha}{\csc\alpha - \operatorname{sen}\alpha}$$

A. 2/3 B. 3/2
C. 4/9 D. 9/4

20. Si: $1 + \sqrt{3}\tan\alpha = \sqrt{3}\sec\theta$
$1 + \sqrt{3}\tan\theta = \sqrt{3}\sec\alpha$
Calcule: $K = \tan\alpha + \tan\theta$.

A. $2\sqrt{3}$ B. $\frac{2\sqrt{3}}{3}$
C. $\frac{\sqrt{3}}{3}$ D. $\sqrt{3}$

21. **Dada las siguientes expresiones:**
$$A = \frac{\sec^4 x - \tan^4 x}{1+\operatorname{sen}^2 x};\ B = \frac{\csc^4 x - \cot^4 x}{1+\cos^2 x}$$
halle $\frac{A}{B}$.

A. $\tan^2 x$ C. $\operatorname{sen}^2 x$
B. $\cot^2 x$ D. 1

22. Si se conoce que $P = \frac{1}{\tan\theta} + \frac{1}{\cot\theta}$ y que $Q = \sec^4\theta + \csc^4\theta$, expresa Q en términos de P. (θ es agudo)

A. P^{-4} C. $P^4 - 2P^2$
B. $1 - 2P^{-2}$ D. $P^2 - 2$



23. Si $\text{sen}^6\alpha + \cos^6\alpha = \frac{4}{7}$, calcula el valor de P.

$P = (\sec^2\alpha + \csc^2\alpha)(\text{sen}^4\alpha - \text{sen}^2\alpha + 1)$

A. $\frac{3}{7}$ C. 4

B. 1 D. 6

24. Calcula C – R si se sabe lo siguiente:

$R = \frac{1}{\cot^2 1°} + \frac{2}{\cot^2 2°} + \frac{3}{\cot^2 3°} + \frac{4}{\cot^2 4°} + ... + \frac{n}{\cot^2 n°}$

$C = \frac{1}{\cos^2 1°} + \frac{2}{\cos^2 2°} + \frac{3}{\cos^2 3°} + \frac{4}{\cos^2 4°} + ... + \frac{n}{\cos^2 n°}$

A. $n^2 - 1$ C. $2n + 1$

B. $\frac{n(n+1)}{2}$ D. $n(n + 1)$

25. Simplifique:

$A = \frac{1}{\csc x - \cot x} - \frac{1}{\csc x + \cot x}$

A. 2 tan x C. 2 sec x

B. 2 cot x D. 2 csc x